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# The Story of a Scientist

— YELLAPRAGADA SUBBAROW



## **Amar Chitra Katha**

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## **The Story of a Scientist**

Yellapragada SubbaRow was a 'rishi' of a scientist. If he is not as wellknown in our country it is because, like the 'rishis' of yore—of whom we know little—his pursuit of knowledge was free of ego. The man who discovered Aureomycin, the man who synthesized folic acid, the man who gave us Hetrazan never pushed himself into the glare of publicity. As the director of research his name should have been at least at the top of the team. But often it took its self-effacing niche in an alphabetical order.

Neither the lowly status of an Indian in the U.S.A. of the early twentieth century nor the demands of applied research stained the scholastic integrity of SubbaRow. Such was the strength of his moral fibre—a strength which distinguished his personal as well as his professional life.

Shri S. P. K. Gupta took thirteen years to write his biography of Yellapragada SubbaRow. It is now being published by Suparna Publications, 5-17

Sriramakrishnapuram, Hyderabad, Andhra Pradesh 500 035; in two volumes.

Shri Gupta's research took him to the places and persons SubbaRow was associated with in India and the U.S.A.

Shri Gupta is now in Moscow as the special correspondent of the P.T.I.

Editor

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# YELLAPRAGADA SUBBAROW

VENKAMMA WAS WORRIED. SCHOOL SHOULD HAVE GOT OVER HOURS AGO, BUT HER SON, SUBBAROW AND HIS COUSIN HAD NOT YET RETURNED HOME.

THEY SHOULD HAVE BEEN BACK BY NOW.

SHE WENT OUT IN SEARCH OF THE BOYS. AT THE NEAREST CART-STAND —

TWO BOYS ABOUT THIRTEEN YEARS OLD?

YES. ONE OF THEM IS MY SON. HAVE YOU SEEN THEM?

I TOOK THEM TO THE CANAL. I'VE JUST RETURNED FROM THERE. THEY WERE WAITING FOR THE BOAT GOING NORTH.

VENKAMMA TOOK THE SAME CART TO THE CANAL.

COULD YOU PLEASE DRIVE FASTER? I SUSPECT THEY ARE RUNNING AWAY FROM HOME!

DON'T BE ANXIOUS. WE'LL BRING THEM BACK.

WHEN THEY REACHED THE CANAL —

THE BOAT HAD LEFT.  
THEY'VE GONE.

DON'T WORRY. THE  
BOAT COULDN'T HAVE GONE  
VERY FAR. I'LL BORROW A  
BICYCLE AND GO AFTER IT.



THE CARTMAN SOON CAUGHT UP WITH THE BOAT.

PLEASE HALT. I WANT  
TO GET INTO THAT  
BOAT.



BOATS ON THIS CANAL WERE,  
AND STILL ARE, HAULED BY  
MEN TRUDGING ALONG THE  
BANK.

THE MEN PULLED THE BOAT TOWARDS THE  
BANK AND TIED THE ROPE TO A TREE. SOON —

COME ON, BOYS. YOU'RE  
GOING RIGHT BACK  
HOME.

NO!



AND SUBBAROW TRIED TO JUMP INTO THE  
WATER. BUT —

WE'RE NOT SWIMMING  
HOME, SON. WE'RE  
GETTING INTO  
ANOTHER BOAT.





AFTER THE CARTMAN HAD GOT SUBBAROW AND HIS COUSIN INTO A HARASAPURAM<sup>2</sup> BOUND BOAT —



SUBBAROW WAS SILENT. HE DID NOT WANT TO TELL THE CARTMAN ABOUT HIS FATHER WHO WAS AILING AND POOR.

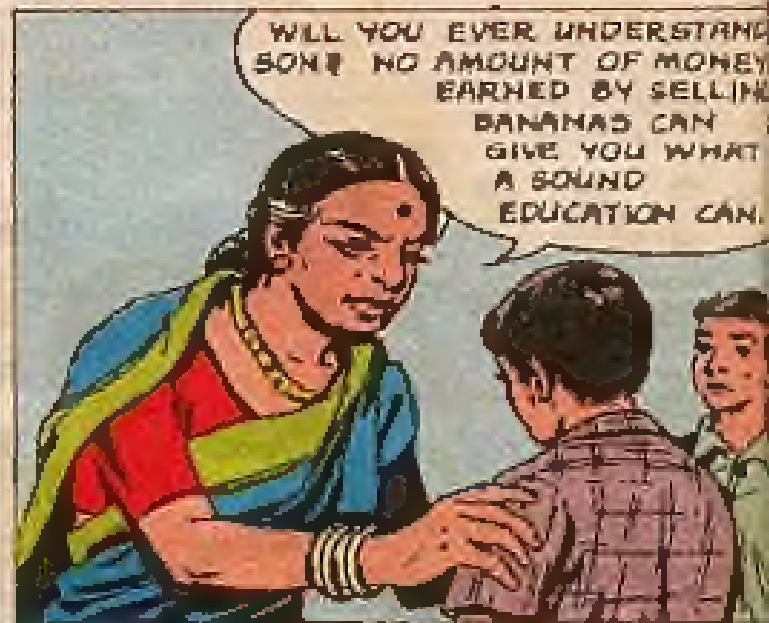


HE DID NOT WANT TO SPEAK ABOUT THE MEagre MEAL THE FIVE CHILDREN HAD TO SHARE.



LEAST OF ALL DID HE WANT TO SPEAK ABOUT HIS GROWING RESENTMENT AGAINST HIS MOTHER.





SUBBAROW TRIED HARD TO CONCENTRATE ON HIS STUDIES, BUT HIS MIND WOULD KEEP WANDERING.



FINALLY WHEN HE APPEARED FOR THE MATRICULATION EXAMINATION, HE FAILED. SO HE WAS SENT FOR A SECOND ATTEMPT TO RAJAMUNDY, WHERE HIS BROTHER, PURUSHOTTAM, A SCHOOLTEACHER, LIVED.

THE ONLY SUBJECT I'M GOOD AT IS MATHEMATICS. I'LL NEVER PASS THIS EXAMINATION.

YOU WILL. DON'T LOSE HEART, SUBBAROW. THAT'S THE WORST THING YOU COULD DO TO YOURSELF.

LIFE IS FULL OF TESTS AND FAILURES. BUT THEY SHOULD ONLY GOAD YOU TO ACHIEVE WHAT YOU WANT.

PURUSHOTTAM WAS AN ACTIVE NATIONALIST. HIS HOME WAS A MEETING PLACE FOR THE FREEDOM-FIGHTERS OF THE TOWN.

SUBBAROW KEENLY FOLLOWED THE DISCUSSIONS. HIS INVOLVEMENT IN THE INTELLECTUAL FERMENT OF THE CITY LEFT HIM LITTLE TIME FOR STUDIES. AND HE FAILED AGAIN.

HE WENT TO MADRAS TO TRY A THIRD TIME TWO MONTHS BEFORE THE EXAMINATION HIS FATHER DIED AND HE RETURNED HOME. CONDITIONS AT HOME WERE AT THEIR WORST. YET —

KEEP THIS MONEY FOR YOUR FARE BACK AND YOUR EXAMINATION FEE.

BUT HOW... WHERE...?

I SOLD MY GOLD ORNAMENTS.

MOTHER...!

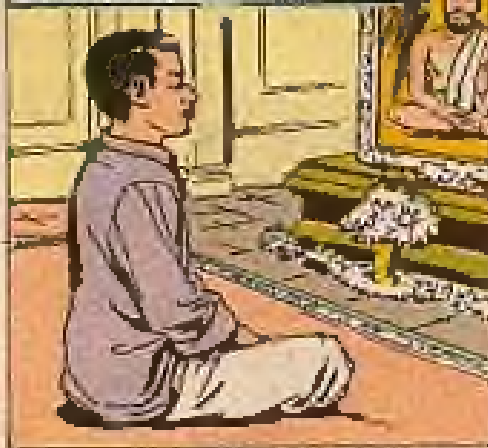
FOR THE FIRST TIME IN HIS LIFE SUBBAROW UNDERSTOOD HIS MOTHER.



THIS TIME HE PASSED THE EXAMINATION AND JOINED PRESIDENCY COLLEGE, MADRAS. IT WAS THE YEAR, 1913.



AROUND THE SAME TIME HE DEVELOPED AN INTEREST IN THE SPIRITUAL LIFE. HE STARTED VISITING THE RAMAKRISHNA MISSION.



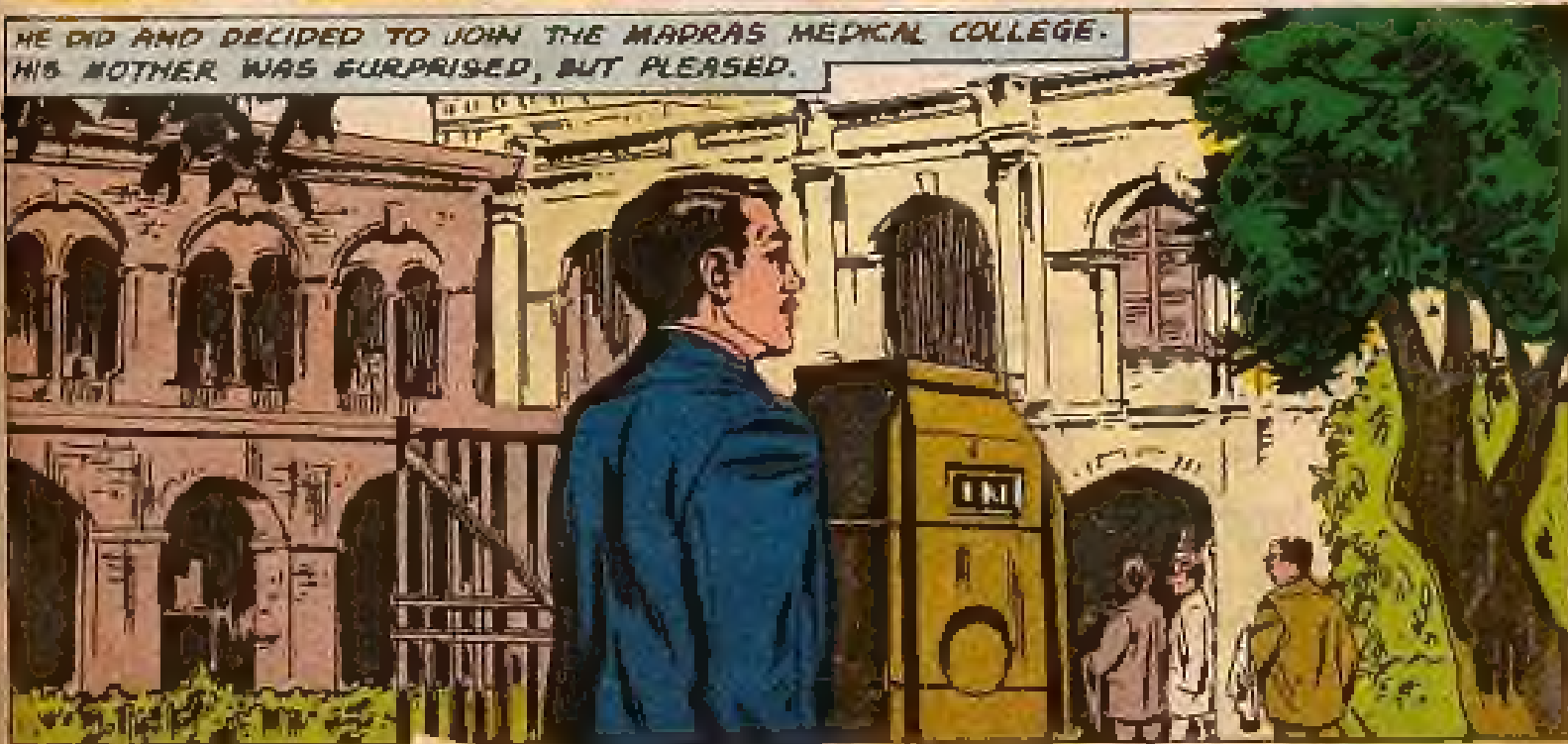
WHEN HE PASSED THE INTERMEDIATE EXAMINATION —



ON THE FOLLOWING DAY, SUBBAROW WENT TO THE RAMAKRISHNA MISSION. HE HAD MADE HIS CHOICE.







AS MONTHS PASSED BY AND HE SAW MEN AND WOMEN SUFFERING AND DYING —



SUBBAROW WAS FIRED WITH A NEW ZEAL. HE PLUNGED INTO HIS STUDIES WITH RENEWED ENTHUSIASM.



ONE VACATION WHEN HE CAME HOME —



THEY HAVE SEVERAL UNMARRIED DAUGHTERS. I WANT YOU TO MARRY ONE OF THEM.

MOTHER, IF I MARRY A RICH MAN'S DAUGHTER, I WILL BE EXPECTED TO MAKE MYSELF RICH, TOO, BY ANY MEANS!



NO MOTHER, I AM NOT INTERESTED. I DO NOT WANT TO RUN AFTER RICHES.



IT WAS ONLY HOWEVER HE WAS DRESSING  
HIS MARRY SOMEONE ONE OF THE  
DAUGHTERS. THE WEDDING TOOK PLACE  
IN 1919



AFTER THE WEDDING, SUBBAROW RETURNED TO  
COLLEGE IT WAS NOW HIS FOURTH YEAR

IN AUGUST 1920 SUBBAROW JOINED THE  
NON COOPERATION MOVEMENT



SUBBAROW SUPPORTED IT BY WEARING KHADI SURGICAL GOWNS

ALL THIS STUFF IS  
NOT DO YOU THINK  
IT'S SOMETHING  
WILL BE THE NEXT  
- CERDY -

NO ONE WOULD THINK  
HE WOULD CONDESCEND  
TO BELONG TO ME, OR



SUBBAROW,  
DR. BRADFIELD  
DIDN'T LIKE  
YOUR RETORT.

HE ASKED  
FOR IT



DON'T FORGET HE IS THE  
PROFESSOR OF SURGERY,  
FOR YOUR SAKE I HOPE  
HE FORGETS THE  
ACCIDENT





AT THE FINAL MEDICAL EXAMINATION SUMARU SECURED GOOD MARKS IN ALL PHASES EXCEPT ONE BUT HE WAS AWAYD TO THE LEADER AND CERTAINLY AHEAD OF THE GROUP'S COURSE

AS AT WASTED MY TIME A PRESENTING IN THE HOSPITAL I DEVOTE MY TIME TO RESEARCH MY COUNTRY IN INDIA



WITH HIS FIRST IN THE WORLD, HE WENT ON



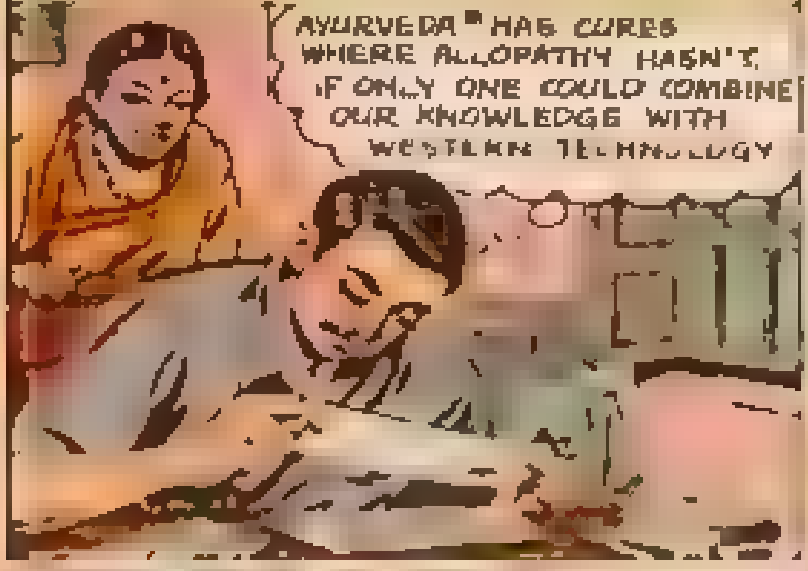
HE WAS THE FIRST IN THE WORLD TO DO THIS



DON'T LOOK SO WORRIED, SUMARU, WILL SOON BE UP AND ABOUT.

HE WAS THE FIRST IN THE WORLD TO DO THIS

FOR A SHORT PERIOD HE WORKED IN THE MAHARAJA UNIVERSITY COLLEGE DURING THE YEARS HIS WIFE JOINED HIM



AYURVEDA HAS CURES WHERE ALLOPATHY HASN'T. IF ONLY ONE COULD COMBINE OUR KNOWLEDGE WITH WESTERN TECHNOLOGY

HE WAS THE FIRST IN THE WORLD TO DO THIS



HMM THEY ARE NOT INTERESTED IN AYURVEDA IF WE WOULD HAVE ME OVER THERE TO DO RESEARCH IN AYURVEDA WE'D

OFFER

WAS FREE TO  
GO TO THE UNITED STATES  
AND MAKE  
SOME MONEY



HER CONSENT. A LOCAL TRUST OFFERED  
A SMALL SCHOLARSHIP AND SUBSISTENCE  
LEFT FOR THE U.S.A. IN THE YEAR 1911



HE WALKED INTO DR. STRONG'S OFFICE AT  
EVENING WITH ONLY A MINUTE'S WARNING  
AND MADE A VERY SHORT OF THE AIR TRIP  
IN WHICH HE WAS  
THE FIRST AT

THE FIRST THE  
HE HAD EVER  
HIMSELF



HE WAS  
ST

AND ALL YOU TALK  
AND AT YOURSELF

THE  
AND  
OR



4 THESE DAYS INDIAN DOCTORS WERE  
NOT ALLOWED TO PRACTISE MEDICINE  
IN AMERICA. THE ONLY JOB SUBBAROW  
LEFT HIMSELF TO  
PICKING UP URINALS AND BED-PAN-



YET HE MANAGED TO FIND TIME TO STUDY AND PASSED THE REQUIRED EXAMINATION HE WAS AWARDED THE DIPLOMA IN TROPICAL MEDICINE

WHAT ARE YOUR PLANS NOW?

THERE ARE SO MANY TROPICAL DISEASES FOR WHICH NO CURE HAS YET BEEN FOUND. I INTEND TO DO RESEARCH IN THAT FIELD.

GOOD LUCK TO YOU. I AM LEAVING FOR SOUTH AMERICA ON AN EXPEDITION

THAT YEAR SUBBAROW ENROLLED HIMSELF FOR A SUMMER COURSE IN BIO-CHEMISTRY AT THE HARVARD SCHOOL OF MEDICINE AND WORKED UNDER PROF. FISKE

SUBBAROW, WE ARE TRYING TO PERFECT THE METHOD OF ANALYSING BLOOD, URINE AND TISSUE FOR PHOSPHORUS

YOUR FIRST TASK IS TO DISCOVER A FAST-WORKING CHEMICAL THAT HELPS TO ESTIMATE THE PHOSPHORUS CONTENT IN TISSUES

SUBBAROW WORKED HARD HE ENTERED HIS LABORATORY AT EIGHT IN THE MORNING AND LEFT IT ONLY WELL PAST MIDNIGHT AT LAST

I'VE FOUND THE ANSWER. THIS CHEMICAL GIVES THE DESIRED RESULT IN LESS THAN A MINUTE

BUT THAT CHEMICAL IS DIFFICULT TO PREPARE. WE NEED SOMETHING SIMPLER



FISKE WAS METICULOUS TO A FAULT, A HARD TASKMASTER AND DIFFICULT TO PLEASE. SUBBAROW WORKED DAY AND NIGHT FOR THE NEXT FOUR MONTHS AND CAME UP WITH THE RIGHT CHEMICAL.

DR FISKE, I'VE FOUND IT. THIS HAS STOOD ALL TESTS, AND IS AVAILABLE IN THE MARKET.



EXCELLENT, SUBBAROW! WE CAN NOW PUBLISH THE RESULTS

ONE OF THE FIRST LESSONS A STUDENT OF BIO-CHEMISTRY LEARNS TODAY IS THE FISKE-SUBBAROW METHOD OF MEASURING PHOSPHORUS IN THE PREPARED TISSUE

WHEN THE HARVARD MEDICAL SCHOOL GRADUATED, SUBBAROW WAS ACCEPTED AS A POST-GRADUATE STUDENT. ONE OF THE PROJECTS HE TOOK UP WAS ABOUT THE SOURCE OF ENERGY WHICH HELPS US MOVE OUR LIMBS, LIFT WEIGHTS AND ASO RUN



THE FISKE SUBBAROW INVESTIGATION LED TO THE DISCOVERY OF A SUBSTANCE IN THE HUMAN BODY CALLED PHOSPHOCREATINE.

WHEN I PUT A MUSCLE TO WORK BY ELECTRIC STIMULATION THE PHOSPHOCREATINE LEVEL BEGINS TO FALL



IT COMPLETELY DISAPPEARS WHEN I CUT OFF THE BLOOD SUPPLY AND DRIVE THE MUSCLE TO THE POINT OF FATIGUE BY CONTINUED ELECTRIC STIMULATION



AND IT REAPPEARS WHEN THE MUSCLE IS ALLOWED A PERIOD OF REST!



IN OTHER WORDS  
THE PRESENCE OF  
PHOSPHOCREATINE  
ENABLES YOU  
TO WORK

AS YOU WORK  
YOU LOSE IT  
BUT AFTER A  
PERIOD OF  
REST YOU  
REGAIN IT AND  
ARE READY  
TO WORK



COULD PHOSPHOCREATINE  
BE THE SOURCE OF  
ENERGY?

WE'LL HAVE  
TO EXPERIMENT  
FURTHER AND  
SEE



HOWEVER, ONE THING IS NOW  
CERTAIN. IT IS NOT  
THE SOURCE OF ENERGY AS  
BELIEVED BY HILL  
AND  
MEYERHOFF



DR. HILL OF LONDON UNIVERSITY AND PROF  
MEYERHOFF OF GERMANY HAD WON THE NOBEL  
PRIZE IN 1922 FOR THEIR THEORY THAT GLYCOGEN  
IS THE SOURCE OF MUSCULAR ENERGY.

THEY HAD BEEN AWARDED THE PRIZE FOR THEIR THEORY OF  
PHOSPHOCREATINE. THE AMERICAN MEDICAL  
ASSOCIATION HAD TAKEN THE MATTER UP  
IN AN EDITORIAL

BUT DR. HILL CONTINUES  
TO BELIEVE THAT  
GLYCOGEN IS THE  
SOURCE OF  
MUSCULAR  
ENERGY



WONDER  
WHAT  
MEYERHOFF  
THINKS

MEYERHOFF HAD SEEN THE IMPORTANCE OF  
THE MATTER AND HAD PLUNGED INTO FOLLOW UP STUDIES.

THEY HAD BEEN AWARDED THE PRIZE FOR THEIR THEORY OF  
PHOSPHOCREATINE. THE AMERICAN MEDICAL  
ASSOCIATION HAD TAKEN THE MATTER UP  
IN AN EDITORIAL

THE SOURCE OF  
ENERGY IS  
GLYCOGEN



A FEW DAYS LATER -

S. BRADON READ THIS JOURNAL  
T'S FROM GERMANY KARL  
JOHANN OF MEYERHOFF'S  
LABORATORY HAS  
ANNOUNCED  
THE DISCOVERY  
OF A.P.

REALLY?

AND THIS JOURNAL WAS  
PUBLISHED SIXTEEN  
DAYS BEFORE OUR  
ANNOUNCEMENT AT  
THE CONFERENCE  
THEY HAVE BEATEN  
US TO IT

IT IS THE  
DISCOVERY  
THAT MATTERS,  
NOT THE  
DISCOVERER

BRADON BY NOW HAD MADE MANY  
FRIENDS ONE OF THEM WAS GORDON ALLEN,  
A YOUNG SCIENTIST

I'M WORKING WITH  
DR. COHN ON A CURE  
FOR PERNICIOUS  
ANAEMIA.

DON'T DAILY DOSES  
OF BROILED LIVER  
WORK?

DO YOU WANT TO  
KNOW HOW OUR PATIENTS  
REACT TO IT? COME,  
I'LL SHOW YOU

AT THE WARD -

UGH! I FEEL LIKE  
BRINGING UP. I CAN'T  
SWALLOW IT

IT IS A MEDICINE, NOT  
A DELICACY! COME ON,  
OPEN YOUR MOUTH.



CAN'T YOU GIVE  
ME AN INJECTION  
INSTEAD?



AFTER -

ISOLATE THE  
SUBSTANCE IN  
LIVER THAT CURES  
ANAEMLA AND THERE I  
THE PATENTS HAVE  
THEIR INJECTION!

THAT'S WHAT WE'VE  
BEEN TRYING TO DO  
BUT, NO LUCK WHY  
DON'T YOU HELP  
US OUT?



HE WAS EXHAUSTED WORKING.

HE WANTED TO WORK ON  
THIS PROJECT THE CURE  
FOR PERNICIOUS ANAEMIA  
ALL ALTHOUGH HE HAD  
FOR A PHYSICAL SURGEON



WE HELPED MY  
BROTHER, BACK IN  
INDIA

OH



PERNICIOUS ANAEMIA AND TROPICAL SPRALE  
ARE SO CLOSE IN THE SYMPTOMS THAT MANY  
MEN BELIEVED THEY HAD A COMMON CURE

ABRAHAM DECIDED TO DO A  
SERIES OF EXPERIMENTS ON ANIMALS

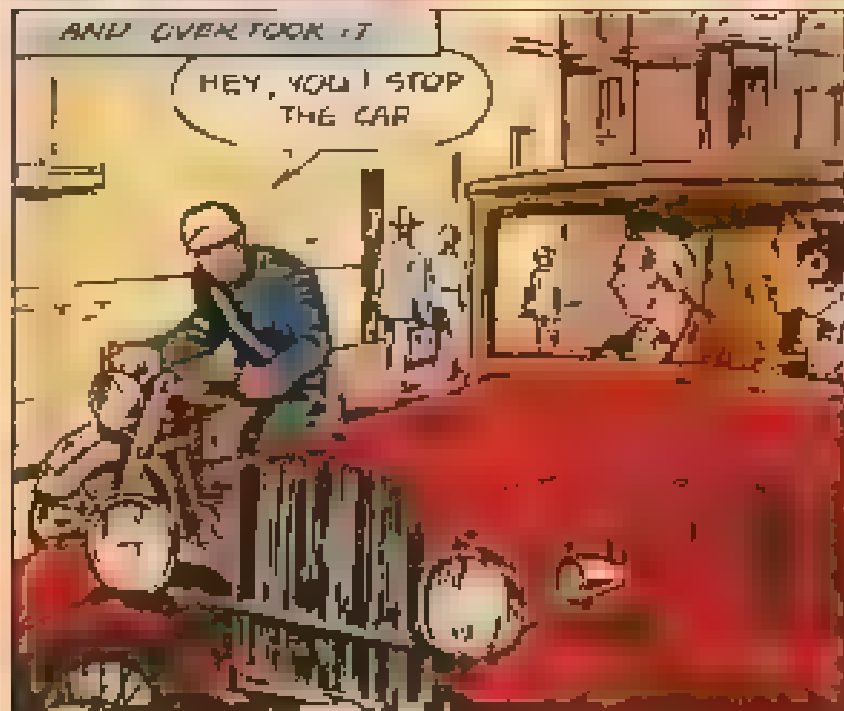
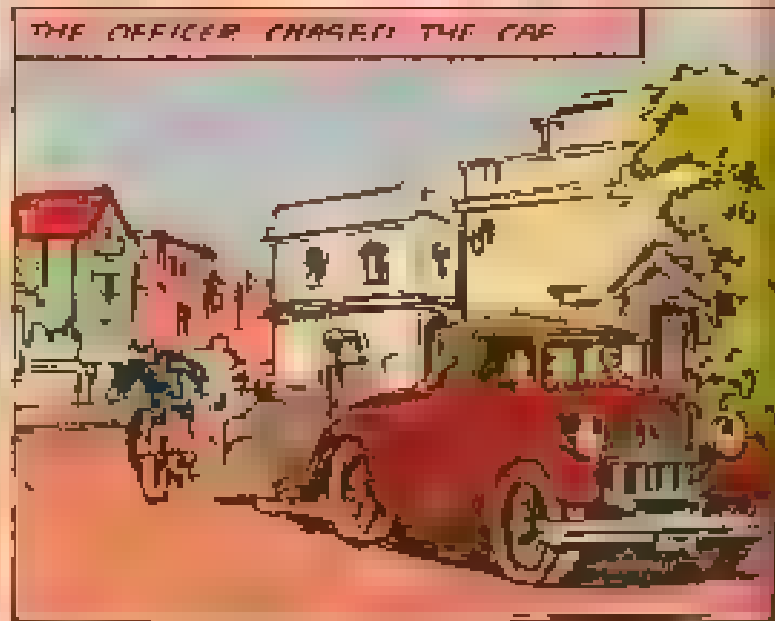
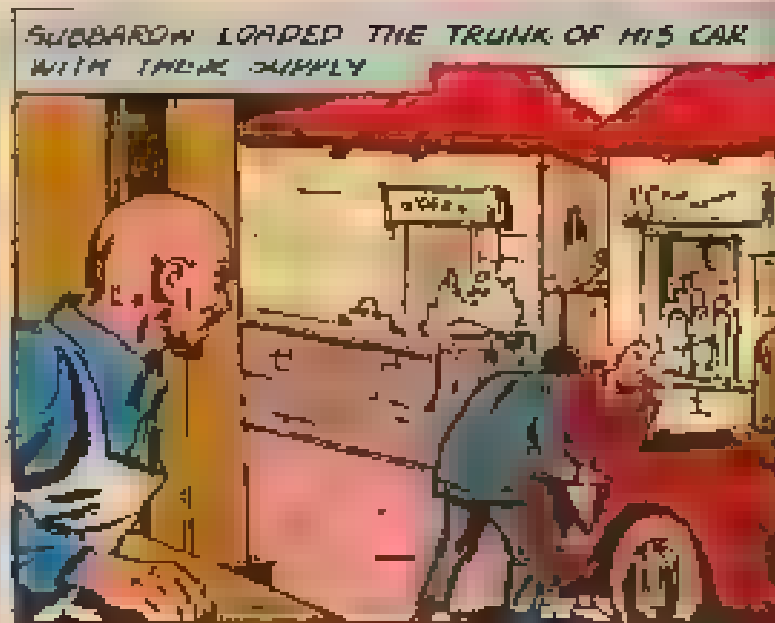
COME,  
LET'S GO AND  
GET SOME  
LIVER



WHAT CAN I DO  
FOR YOU, SIR?

WE WANT  
SOME LIVER





SUBBAROW OBTAINFULLY OBEYED

WHAT! LIVER! ARE YOU SURE NOTHING IS HIDDEN IN THERE?

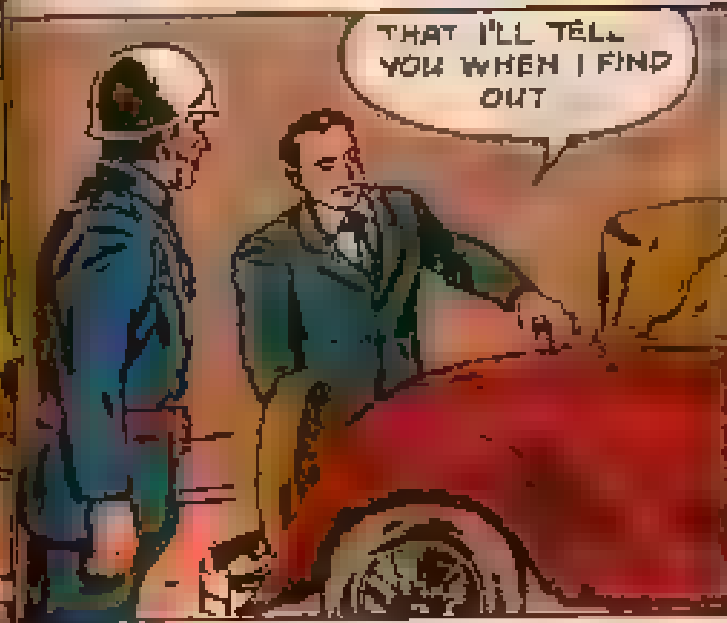


THERE IS SOMETHING HIDDEN IN THERE

WHAT IS IT?



THAT I'LL TELL YOU WHEN I FIND OUT



AND SUBBAROW AND HIS ASSISTANT DROVE AWAY LEAVING THE OFFICER PERPLEXED.



SUBBAROW WORKED WITH A JUNIOR SCIENTIST, JACOBSON, ON THE PROJECT. THE PROGRESS WAS VERY SLOW BECAUSE SUBBAROW DID NOT HAVE THE NECESSARY EQUIPMENT FOR SUCH A DIFFICULT PROJECT.

JACOBSON NOW I WISH I HAD A WELL-EQUIPPED LAB WHERE I COULD WORK AS I PLEASED

AND WITH A LIBERAL BUDGET!

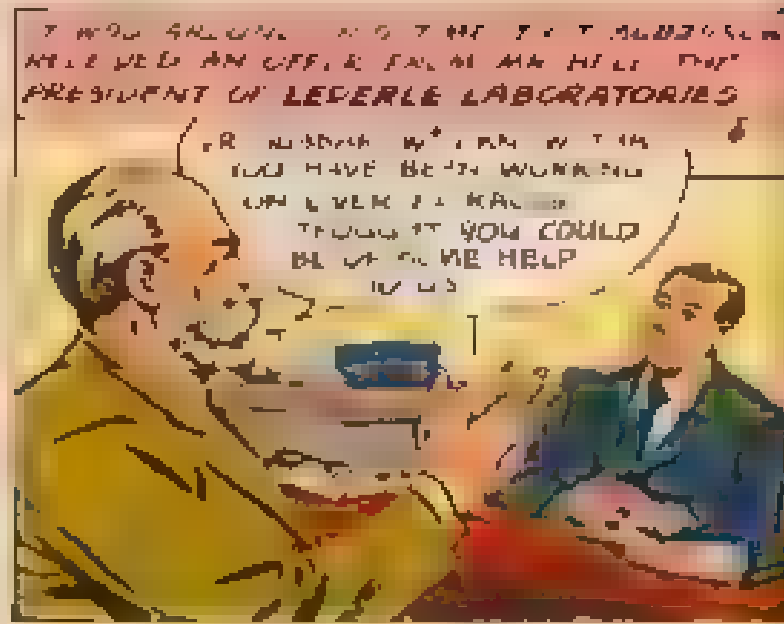


AT LAST SUBBAROW AND JACOBSON CAME OUT WITH A LIVER EXTRACT WHICH COULD BE INJECTED

THANK GOD DON'T HAVE TO EAT RAW LIVER ANYMORE!







DO HAVE THE  
AMOUNT PROVIDED

YOU GET A  
WELL-EQUIPPED  
RESEARCH  
LABORATORY  
WHERE I CAN  
WORK AS  
I WANT

IT'LL BE  
DONE

I'LL ASK UP HE  
HOD THE DAY T  
S READY

HE LEFT FOR A LONG TIME WHEN SUBARROW LEFT  
BEHIND AFTER SEVENTEEN YEARS OF  
OUTSTANDING ACHIEVEMENT WORK

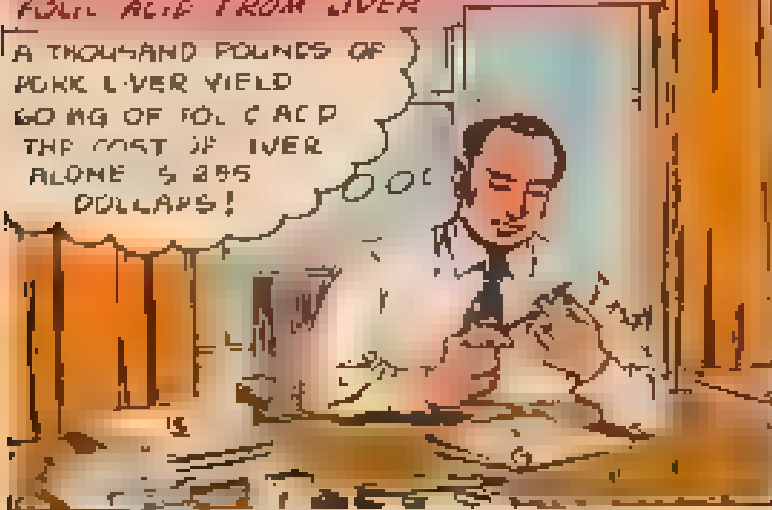
HERE IS THE  
AB YOU  
WANTED

IN 1940 SUBARROW / NEW CLIMATE  
LABORATORY IS HIS AN ASSOCIATE  
DIRECTOR OF RESEARCH

PLEASE WHEN YOU WORK  
FOR ME YOU KNOW  
IT YOU WILL GET IN  
REACH BUT HE HAS  
MADE THE ALL OF  
OPPORTUNITY

AMONG THE SEVERAL PROJECTS TAKEN UP BY THE SUBBAROW TEAM WAS THE EXTRACTION OF THE VITAMIN CALLED FOLIC ACID FROM LIVER

A THOUSAND POUNDS OF PORK LIVER YIELD 60 MG OF FOLIC ACID THE COST OF LIVER ALONE \$ 255 DOLLARS!



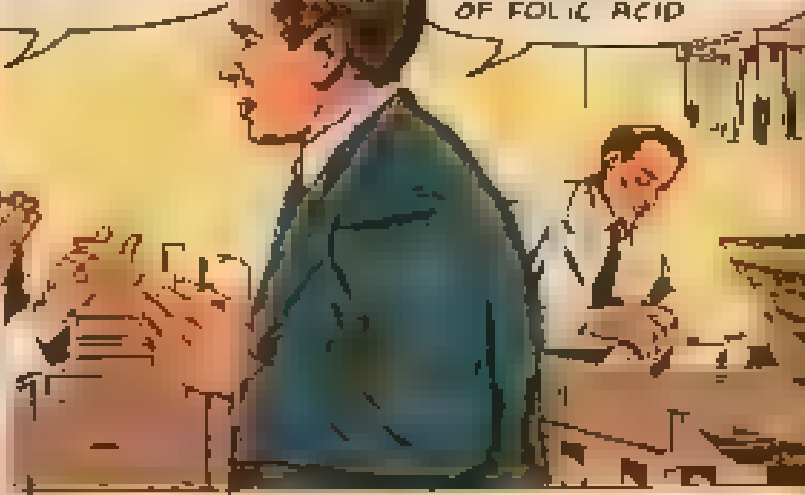
WE CANNOT AFFORD SUCH COLOSSAL EXPENDITURE IF WE COULD SYNTHESISE FOLIC ACID



ONE OF THE GROUPS SUCCEEDED IN FINDING OUT THE BASIC STRUCTURE OF FOLIC ACID

THE THREE BASIC COMPONENTS ARE FOUND SEPARATELY IN YELLOW PIGMENTS OF BUTTERFLIES, IN WHEAT AND IN YEAST

THEN SYNTHESISE THOSE THREE COMPONENTS AND PROCEED WITH THE SYNTHESIS OF FOLIC ACID



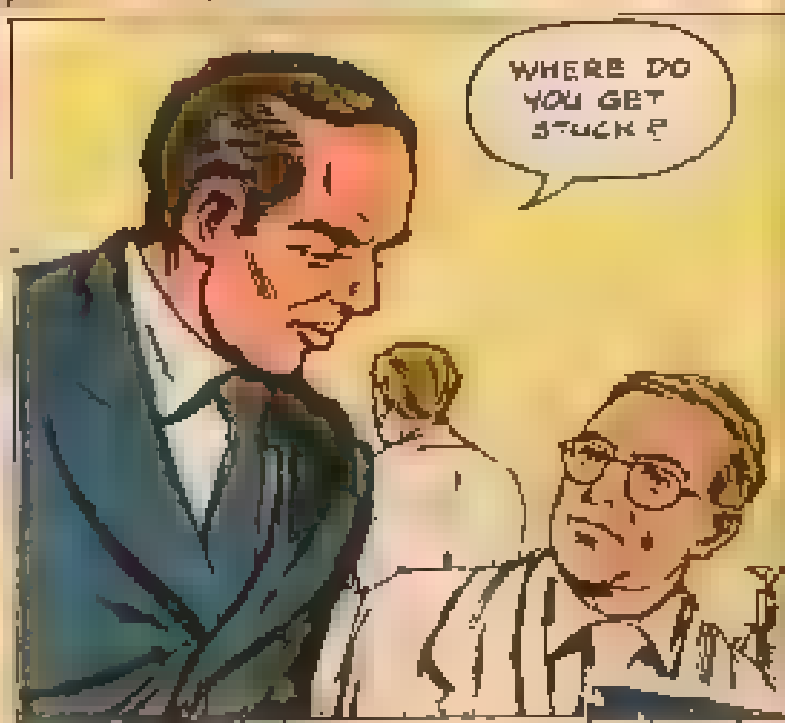
IT WAS NOT EASY TO FIND THE RIGHT COMBINATION TO GET FOLIC ACID OVER A DOZEN CHEMISTS WORKED ROUND THE CLOCK FOR A YEAR THEN ONE DAY

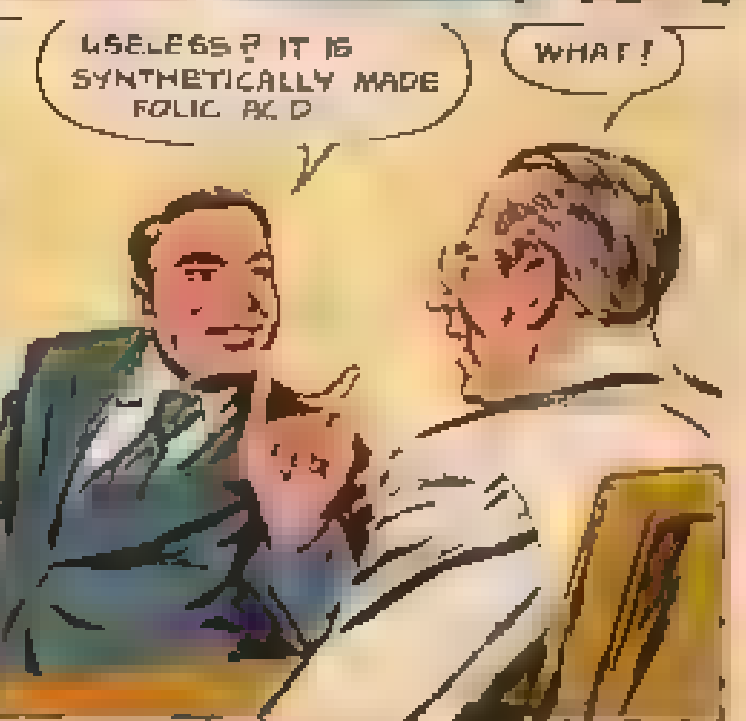
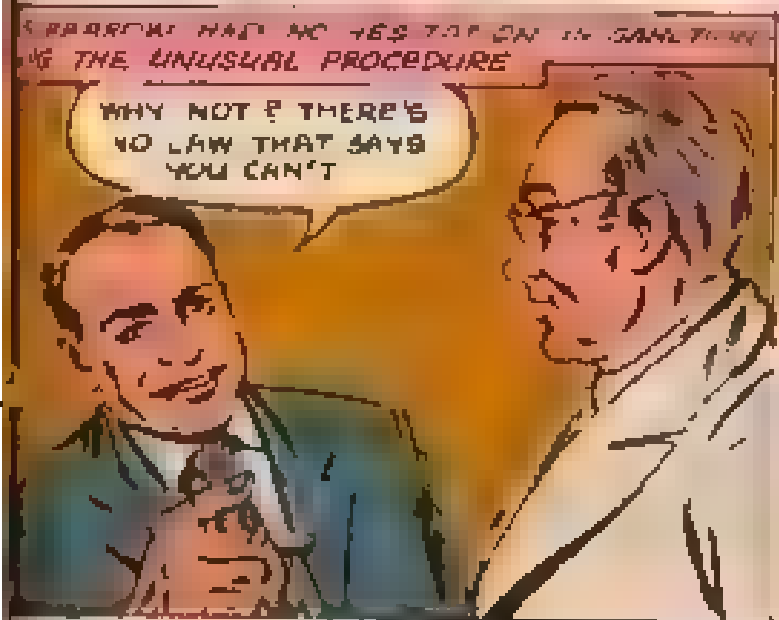
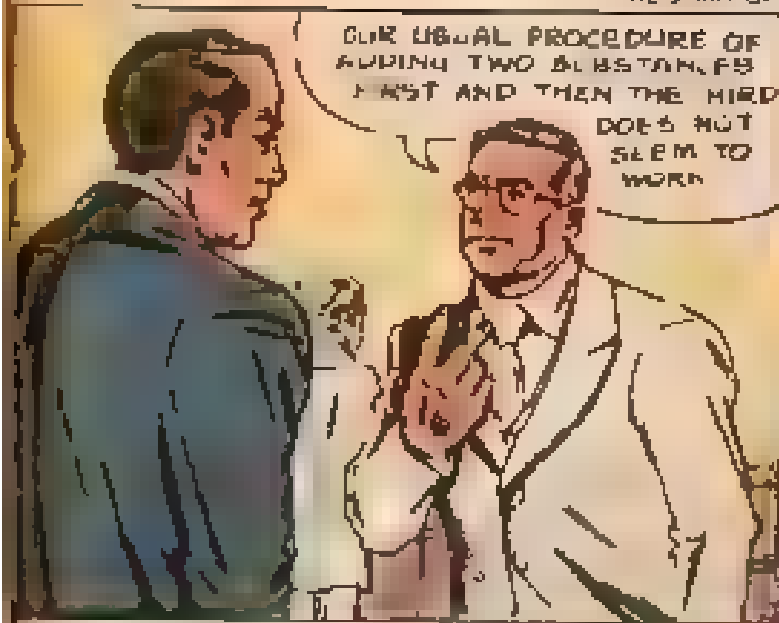
COY WALLER, ANY PROGRESS?

NO, DR SUBBAROW WE HAVE TRIED ALL COMBINATIONS BUT WITH NO RESULTS



WHERE DO YOU GET STUCK?







THE NEW MEDICINE HAD TO APPEAR IN PATIENTS SUFFERING FROM ANAEMIA AND TODAY WE HAVE ONE OF THE FIRST RESULTS RELEASED WAS TALKING LAST YEAR

BAD NEWS FOLIC ACID IS OF NO USE IN TREATING PERNICIOUS ANAEMIA

OH!

BUT WHEN REPORTS FROM ANOTHER QUARTER CAME IN

MR DARBY HAS DECLARED IT A WINNER - IT CAN DO THE WORK



SO AT LAST WE HAVE THE CURE FOR SPRUE WHICH KILLED MY BROTHER!

IN THE SCIENTIFIC WORLD AND EVEN IN THE FOLIC ACID SYNTHESIS, SUBBAROW CLAIMED NO SPECIAL CREDIT. HE GAVE HIS NAME AS ONE OF THE SEVEN SCIENTISTS WHO WERE AS A RULE WITH THE FOLIC

THE ALLEGMENTS OF SCIENCE ARE BUILT ON THE EFFORTS OF MANY

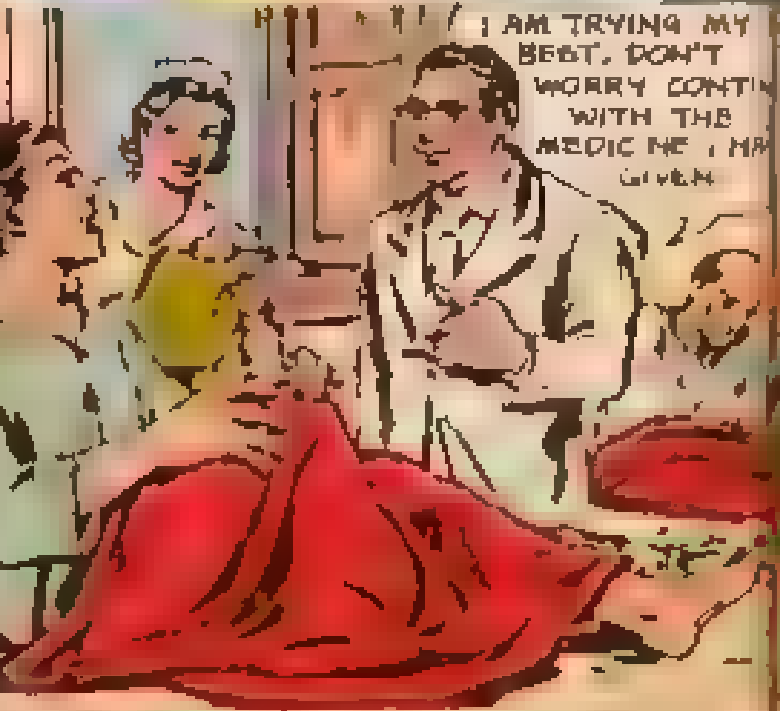


AFTER A FEW MONTHS, THE DISCOVERY OF FOLIC ACID LED TO THE DISCOVERY OF VITAMIN B12 BY ANOTHER PHARMACEUTICAL COMPANY.

WHEN A FARMER LATER DRUG SUBBAROW WAS BUSY WITH THE SEARCH FOR A CURE FOR THE DREADED DISEASE, THEY HAD BEEN POSTED IN THE TROPICAL ISLANDS OF THE PACIFIC

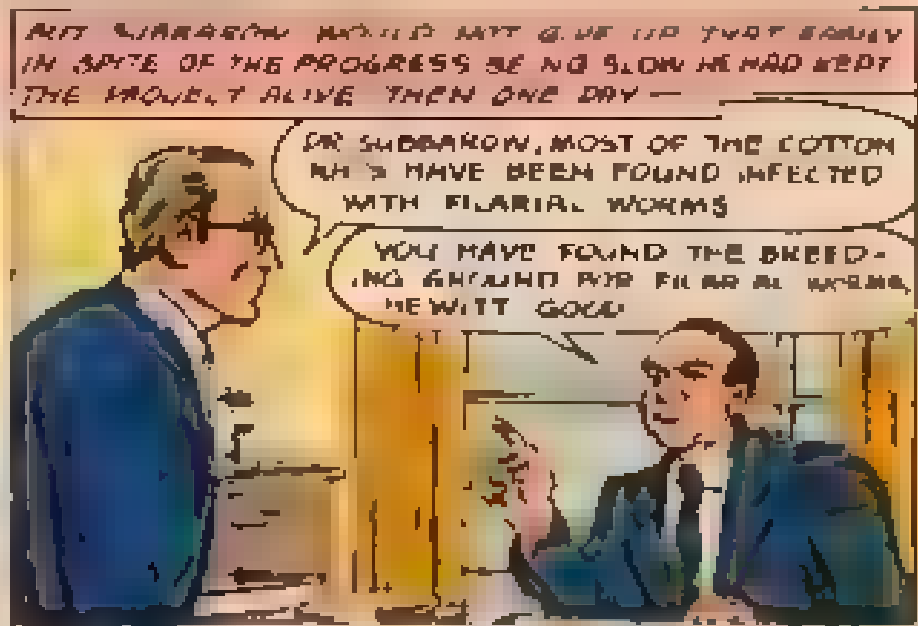
DOCTOR, PLEASE DO SOMETHING FOR ME. I'M GOING THROUGH HELL.

I AM TRYING MY BEST, DON'T WORRY CONTINUE WITH THE MEDICINE I HAVE GIVEN





MEDICINE I WONDER WHEN WE'LL EVER FIND A CURE FOR THIS DISEASE.



MY SUBBARON WON'T GIVE UP THAT EASY IN SPITE OF THE PROGRESS BEING SLOW HE HAD KEPT THE MOUSE ALIVE THEN ONE DAY —

DR SUBBARON, MOST OF THE COTTON Bolls HAVE BEEN FOUND INFECTED WITH FILARIAL WORMS

YOU HAVE FOUND THE BREEDING GROUND FOR FILARIAL WORMS, HEWITT GOLD

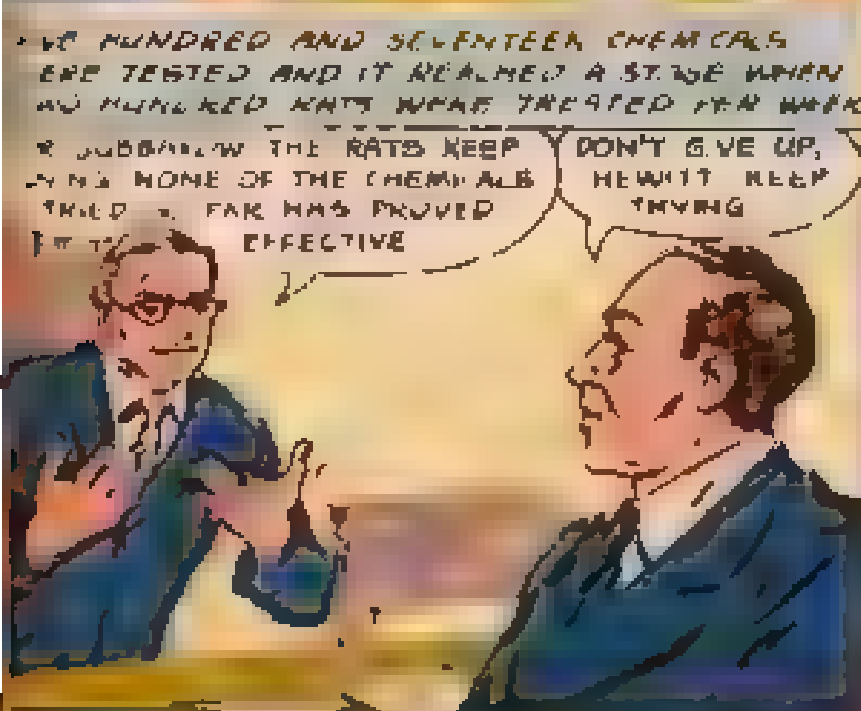


AND I HOPE YOU WILL ALSO FIND THE CHEMICAL THAT WILL DESTROY THOSE WORMS

I'LL TRY



THE INITIAL TEST BEGAN ON TWENTY RATS PER WEEK

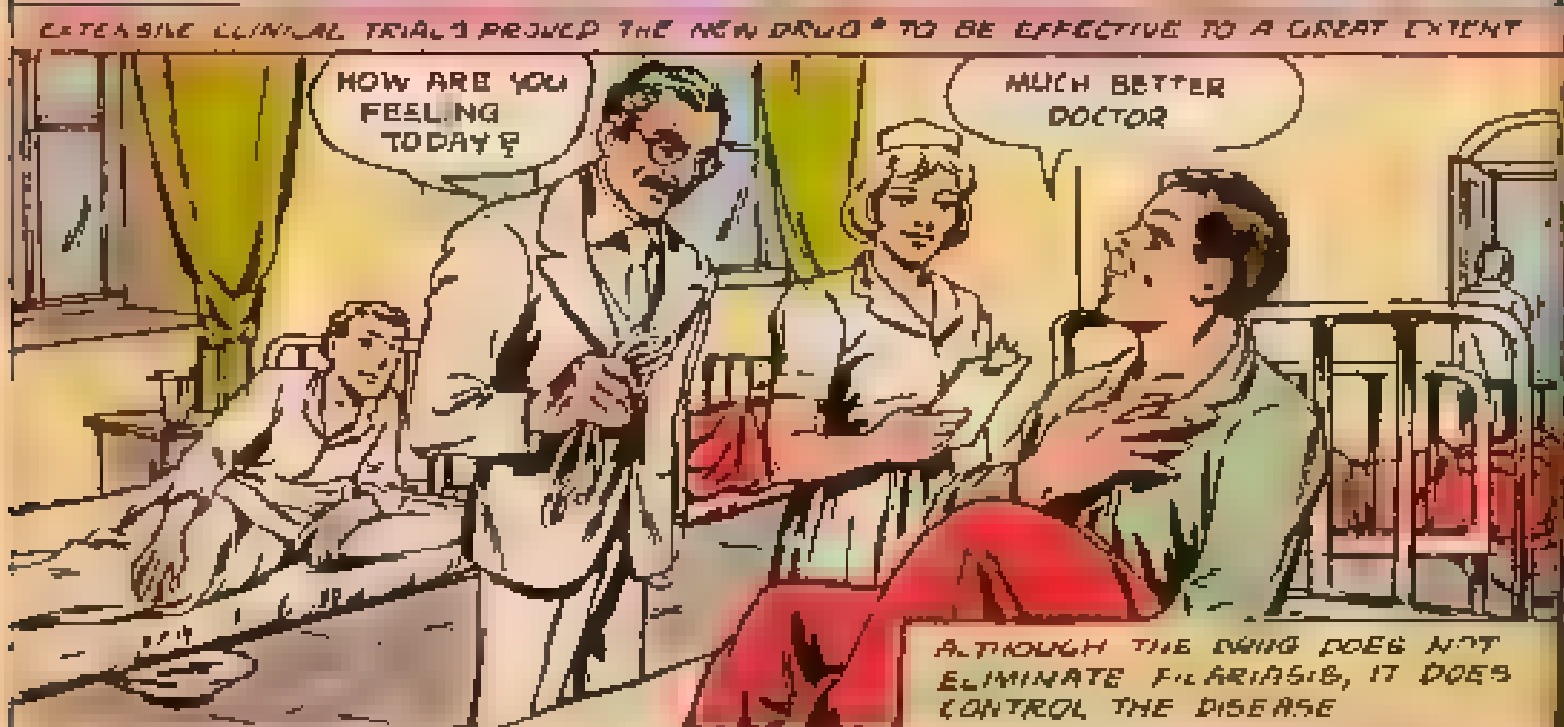
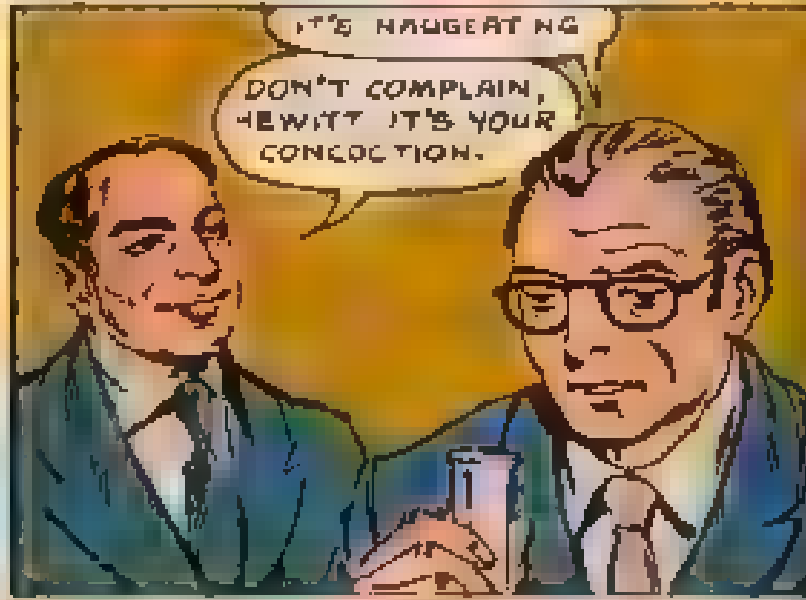


FIVE HUNDRED AND SEVENTEEN CHEMICALS WERE TESTED AND IT REACHED A STAGE WHEN TWO HUNDRED RATS WERE TREATED PER WEEK & SUBBARON THE RATS KEEP DYING & NONE OF THE CHEMICALS THIED & FAR HAS PROVED EFFECTIVE

DON'T GIVE UP, HEWITT KEEP TRYING



AND BRING ME THE RAT THAT SURVIVES



THEY WERE ALLY NAMED IN ONE SINGLE  
WELL, SUBBARDON THOUGHT HIS HADEN IN TO OTHER  
DISEASES

I WOULD LIKE TO HAVE A  
MEDICINE WHICH IS  
EFFECTIVE AGAINST  
NOT JUST ONE  
DISEASE BUT  
SEVERAL

YOU MEAN AN ANTIBIOTIC  
FOR A WIDE RANGE OF  
INFECTIONS?



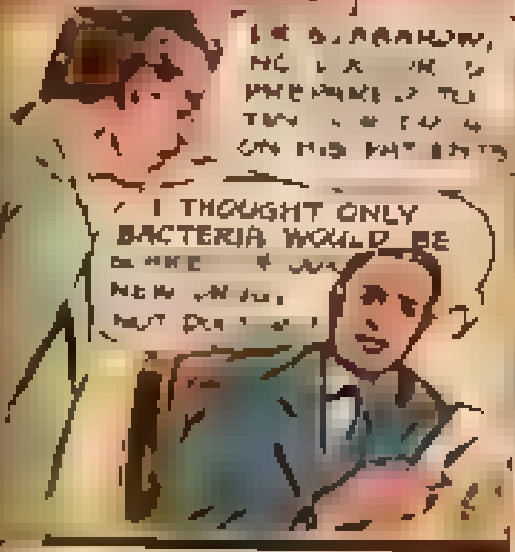
6. LET'S EXAMINE  
ALL THE POSSIBLE  
SOURCES OF  
ANTIBIOTICS



IT WAS EASIER SAID THAN DONE IT TOOK  
FIVE YEARS OF HARD WORK WITH MANY  
MOMENTS OF DESPAIR AND FRUSTRATION  
BEFORE SUBBARDON'S TEAM CAME OUT WITH  
THE ANSWER - TELLING DR. WRIGHT WHICH  
SUBBARDON WAS LOOKING FOR.



IN LATE 1945 AT  
LONDON AND THE NEW  
YORK CITY, DR. WRIGHT  
AND DR. SUBBARDON  
WAS VERY  
INTERESTED



DR. SUBBARDON,  
NO ONE IN THE  
MEDICAL FIELD  
THINKS ABOUT  
ON HIS PATIENTS

I THOUGHT ONLY  
BACTERIA WOULD BE  
KILLED BY AN  
ANTIBIOTIC  
BUT DR. WRIGHT

THEN SUBBARDON WROTE  
IN 1945 ABOUT OF  
HARD WORK IN NEW  
YORK

DR. WRIGHT, I'VE A  
DRUG NO ONE IS WILLING  
TO USE. I HAVE FAITH IN  
IT. WOULD YOU GIVE IT  
A TRIAL?

I HAVE A FRIEND  
WHO IS SUFFERING FROM  
A VIRAL DISEASE FOR  
WHICH NO ONE  
HERE HAS



THEY WERE THE  
ONLY TWO  
TRYING TO  
KILL A DRUG





INDEED THE NEW ANTIBIOTIC DID TURN OUT TO BE A MIRACLE DRUG.

YES, DR. WRIGHT?

MY PATIENT IS CURED. SEND SOME MORE OF YOUR NEW MEDICINE.



THE TETRACYCLINES NOW AVAILABLE ARE ALL DERIVED FROM THE ONE DEVELOPED BY SUBBARDON'S TEAM.

IN THE COURSE OF HIS RESEARCHES, SUBBARDON'S ATTENTION HAD BEEN DRAWN TO CANCER, TOO. HIS TEAM CAME OUT WITH A MEDICINE CALLED AMINOPTERIN FOR TREATING CANCER OF THE BLOOD IN CHILDREN.

LET'S ARRANGE FOR A CLINICAL TRIAL.



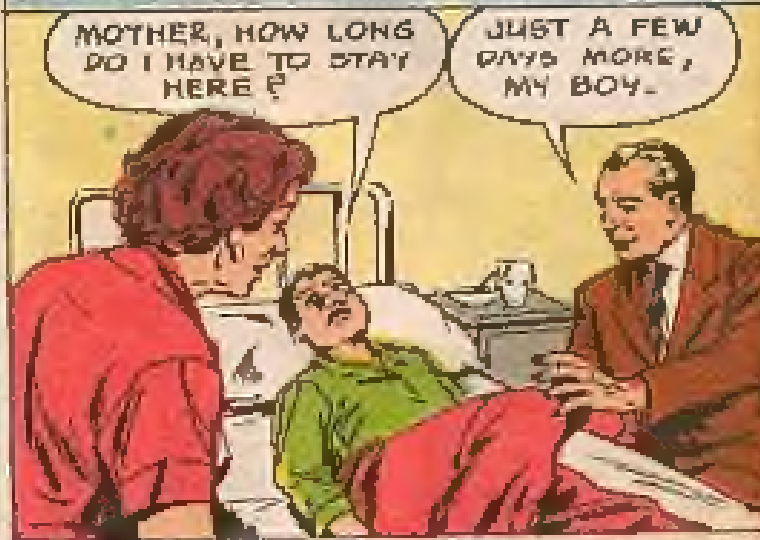
THAT SAME DAY A BOY SUFFERING FROM BLOOD CANCER WAS ADMITTED TO A BOSTON HOSPITAL.



THE BOY WAS TREATED WITH THE NEW MEDICINE AND HE STARTED IMPROVING.

MOTHER, HOW LONG DO I HAVE TO STAY HERE?

JUST A FEW DAYS MORE, MY BOY.



AT LAST THE TREATMENT WAS OVER AND THE BOY WAS DISCHARGED.

MOTHER, ARE WE GOING HOME TODAY?

YES, MY DEAR, WE CAN NOW GO HOME.



DOCTOR, HAS MY BOY BEEN CURED?



TO BE FRANK, NO, MADAM.  
THE TREATMENT HAS  
PROLONGED HIS LIFE  
FOR A FEW MONTHS  
ONLY.

OH!

CAN'T THE MAN WHO  
HAS GIVEN US  
SKINOPTERIN COME  
OUT WITH A  
PERMANENT CURE?

WHY NOT, MADAM?  
GOD WILLING HE  
MAY, BEFORE YOUR  
CHILD HAS A  
RELAPSE.

IN FACT WITHIN A FEW MONTHS SUBBAROW  
AND HIS COLLEAGUES CAME OUT WITH  
METHOTREXATE WHICH WAS EVEN MORE  
EFFECTIVE IN TREATING NOT ONLY BLOOD  
CANCER BUT ALSO OTHER TYPES OF  
CANCER AS WELL.

DR. SUBBAROW,  
WHAT ARE YOUR  
FUTURE PLANS?

I WOULD LIKE TO BUILD  
AN INDEPENDENT CANCER  
RESEARCH UNIT,  
MR. BELL...

...IF YOU  
SANCTION IT.

GO AHEAD,  
DR. SUBBAROW.  
I'LL BACK YOU  
ALL THE WAY.

SUBBAROW FINALISED THE PLANS FOR THE CANCER RESEARCH UNIT.  
HOWEVER, HE DID NOT LIVE TO SEE IT ESTABLISHED. HE DIED OF  
HEART FAILURE AT THE AGE OF FIFTY-THREE.



